

REMARKS

The claims now pending in the application are Claims 1 to 13, 16, 17, 19 and 20, the independent claims being Claims 1, 2, 8, 12, 13 and 19. Claims 14, 15, 18, 21 and 22 have been cancelled herein. Claims 1 to 13, 16, 17, 19 and 20 have been amended herein.

In the Official Action dated December 31, 2003, Claims 1 to 4, 6 to 8, 10 to 15, 17 to 19, 21 and 22 were rejected under 35 U.S.C. § 102(a), as anticipated by U.S. Patent No. 6,313,564 (Kataoka). Reconsideration and withdrawal of the rejection respectfully are requested in view of the above amendments and the following remarks.

Initially, Applicant gratefully acknowledges the Examiner's indication that the application contains allowable subject matter, and that Claims 5, 9, 16 and 20 are allowable over the prior art.

In formal matters, Applicant's attorney requests acknowledgment of the Substitute Specification submitted with the Amendment timely filed September 30, 2003.

The rejection of the claims over the cited art respectfully is traversed. Nevertheless, without conceding the property of the rejection, Claims 14, 15, 18, 21 and 22 have been cancelled, and Claims 1 to 13, 16, 17, 19 and 20 have been amended more clearly to recite various novel features of the present invention, with particular attention to the Examiner's comments. Support for the proposed amendments may be found in the original application. No new matter has been added.

The present invention relates to a novel control apparatus and method for a vibration type actuator which makes driving vibration at a driving unit of a vibration member by applying an alternating signal to an electro-mechanical energy conversion element and uses at least a frequency of the alternating signal as a speed control parameter.

In one aspect, as recited in independent Claim 1, the control apparatus comprises a driving circuit capable of changing a voltage of the alternating signal to be applied to the electro-mechanical energy conversion element, and a control unit

communicatively coupled to the driving circuit, and which causes the driving circuit to change the voltage of the alternating signal so that at least an absolute value of a slope of a frequency-speed characteristic of the actuator is within the desired range in a frequency band of predetermined range.

In another aspect, as recited in independent Claim 2, the control apparatus comprises such a driving circuit and a control unit which causes the driving circuit to change the voltage of the alternating signal so that an absolute value of a slope of a frequency-speed characteristic of the actuator is equal to or greater than a predetermined value at least in a frequency band of predetermined range.

In another aspect, as recited in independent Claim 8, the control apparatus comprises such a driving circuit and a control unit which controls the driving circuit in a frequency range higher than a predetermined frequency so that the voltage of the alternating signal decreases as the predetermined frequency becomes a higher frequency.

Independent Claims 12, 13 and 19 recite similar features with respect to a control method for such a vibration type actuator.

Applicant submits that the prior art fails to anticipate the present invention. Moreover, Applicant submits that there are differences between the subject matter sought to be patented and the prior art, such that the subject matter taken as a whole would not have been obvious to one of ordinary skill in the art at the time the invention was made.

The Kataoka '564 patent relates to a driving apparatus for a vibration type actuator apparatus, and discloses a driving apparatus including an evaluating device which evaluates a wear state of a friction surface between a vibration member and a movable member in a vibration type actuator apparatus. The Kataoka '564 patent detects a change of driving speed of the vibration type actuator at the time of setting an alternating signal which is applied to an electro-mechanical energy conversion element of the vibration member to a predetermined frequency, and a change of frequency of the alternating signal which is required for setting the driving speed of the vibration type actuator to a

predetermined speed; based on these detections, the Kataoka '564 patent determines a time at which a friction portion of the vibration member should be replaced. The Kataoka '564 patent also illustrates a frequency-speed performance characteristic of the vibration type actuator according to a relative amount of abrasion. However, Applicant submits that the Kataoka '564 patent fails to disclose or suggest at least the above-described features of the present invention. Specifically, in the Kataoka '564 patent, a 'driving voltage generating means' controls the alternating signal; However, the driving voltage generating means controls speed by changing the *frequency* of the alternating signal, not the *voltage* of the alternating signal. Applicant further submits the Kataoka '564 patent fails to disclose or suggest an apparatus or method for controlling the slope of the frequency-speed performance characteristic, as disclosed and claimed in the present application; the Kataoka '564 patent fails to disclose or suggest an apparatus or method for setting a value of the slope of the frequency-speed characteristic so as to be within a predetermined range (Claims 1 and 12), or an apparatus or method for setting the value of the slope of the frequency-speed characteristic to a value greater than or equal to a predetermined value (Claims 2 and 13). Nor is the Kataoka '564 patent understood to disclose or suggest controlling the voltage of the alternating signal so as to set an absolute value of the slope of the frequency-speed characteristic within a frequency band of predetermined range (Claims 1 and 12), controlling the voltage of the alternating signal so as to set an absolute value of the slope of the frequency-speed characteristic to a value equal to or greater than a predetermined value (Claims 2 and 13), or controlling the voltage of the alternating signal so as to decrease as the predetermined frequency becomes a higher frequency (Claims 8 and 19), as disclosed and claimed in the present application.

For the above reasons, Applicant submits that independent Claims 1, 2, 8, 12, 13 and 19 are allowable over the cited art.

Claims 3 to 7, 9 to 11, 16, 17 and 20 depend from Claims 1, 2, 8, 12, 13 and 19, respectively, and are believed allowable for the same reasons. Moreover, each of these

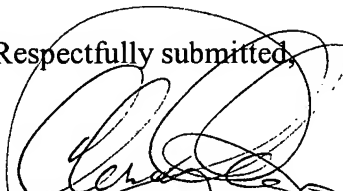
dependent claims recites additional features in combination with the features of its respective base claim, and is believed allowable in its own right. Individual consideration of the dependent claims respectfully is requested.

Applicant requests that the present Amendment be entered under 37 CFR § 1.116. Applicant submits that the present amendments merely are minor or formal in nature, and reduce the number of issues for consideration. Applicant believes the present Amendment was necessitated by the outstanding Official Action, and submits that the present amendments were not previously made because Applicant believes the prior claims are allowable.

Applicant believes that the present Amendment is responsive to each of the points raised by the Examiner in the Official Action, and submits that the application is in allowable form. Favorable consideration of the claims and passage to issue of the present application at the Examiner's earliest convenience earnestly are solicited.

Applicant's undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should continue to be directed to our below listed address.

Respectfully submitted,



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